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EXAMINER

ZERVIGON, RUDY

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. Claim 9 recites the limitation “reserve tank”. There is insufficient antecedent basis for this limitation in the claim. The claimed “reserve tank” is assumed to be the previously claimed “reservoir tank”.

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
5. Claims 1, 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Patel; Satyadev R. et al. (US 6942811 B2) in view of Ohmi; Tadahiro et al. (US 6217633 B1). Ohmi teaches a substrate (14; Figure 2; column 4; line 37) processing system (Figure 2; column 4; lines 21-66) comprising: a gas supply source (19 or 20; Figure 2; column 3; lines 15-25) for supplying a first process gas containing a first reactive substance; a reservoir tank (12; Figure 2; column 3; lines 10-25) connected to said gas supply source (19 or 20; Figure 2; column 3; lines 15-25) for reserving the first process gas; a reactor (15; Figure 2; column 3; lines 10-25) connected to said reservoir tank (12; Figure 2; column 3; lines 10-25) for exposing a substrate (14; Figure 2;

Art Unit: 1792

column 4; line 37) placed therein to the first process gas; a first circulation pipe (36; Figure 2; column 5; line 2) for introducing the first process gas from said reactor (15; Figure 2; column 3; lines 10-25) to said reservoir tank (12; Figure 2; column 3; lines 10-25); a second circulation pipe (return at 85; Figure 2; column 5; line 2) for introducing at least part of the first process gas from said reservoir tank (12; Figure 2; column 3; lines 10-25) to said reactor (15; Figure 2; column 3; lines 10-25); and a flow regulating valve (85; Figure 2; column 3; line 20) disposed in said second circulation pipe (return at 85; Figure 2; column 5; line 2), the pressure pump (23; Figure 2; column 3; line 25) being a single unit operative to generate a pressure difference between said reactor (15; Figure 2; column 3; lines 10-25) and said reservoir tank (12; Figure 2; column 3; lines 10-25) to cause the first process gas to flow from said reactor (15; Figure 2; column 3; lines 10-25) to said reservoir tank (12; Figure 2; column 3; lines 10-25) without an intervening pump; a pressure pump upstream valve (27; Figure 2; column 3; line 25) disposed between said reactor (15; Figure 2; column 3; lines 10-25) and said pressure pump (23; Figure 2; column 3; line 25); a pressure pump downstream valve (any of 24,25; Figure 2; column 3; line 25) disposed between said pressure pump (23; Figure 2; column 3; line 25) and said reservoir tank (12; Figure 2; column 3; lines 10-25) – claim 1. Applicant's claim requirement of "a process gas containing a reactive substance" is a claim requirement of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable

Art Unit: 1792

of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

Patel further teaches:

- i. The substrate processing system of claim 1, wherein said pressure pump (23; Figure 2; column 3; line 25) is fluidly connected between said reactor (15; Figure 2; column 3; lines 10-25) and said first circulation pipe (36; Figure 2; column 5; line 2) such that the pressure difference causes the first process gas to flow from said reactor (15; Figure 2; column 3; lines 10-25) to said reservoir tank (12; Figure 2; column 3; lines 10-25) through said first circulation pipe (36; Figure 2; column 5; line 2), as claimed by claim 8. That 23 is “connected” in a manner such “that the pressure difference causes the first process gas to flow from said reactor (15; Figure 2; column 3; lines 10-25) to said reservoir tank (12; Figure 2; column 3; lines 10-25) through said first circulation pipe (36; Figure 2; column 5; line 2)” is evidenced for meeting the claimed limitation. When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).
- ii. The substrate processing system of claim 1, wherein said pressure pump (23; Figure 2; column 3; line 25) is fluidly connected to each of said reactor (15; Figure 2; column 3; lines 10-25) and said first circulation pipe (36; Figure 2; column 5; line 2) such that operation of said pressure pump (23; Figure 2; column 3; line 25) causes the first process gas to flow from said reactor (15; Figure 2; column 3; lines 10-25) to said reserve tank (12; Figure 2; column 3; lines 10-25) through said first circulation pipe (36; Figure 2;

column 5; line 2) and causes the first process gas to flow from said reservoir tank (12; Figure 2; column 3; lines 10-25) to said reactor (15; Figure 2; column 3; lines 10-25) through said second circulation pipe (return at 85; Figure 2; column 5; line 2), as claimed by claim 9

- iii. A substrate (14; Figure 2; column 4; line 37) processing system comprising: a gas supply source (19 or 20; Figure 2; column 3; lines 15-25) for supplying a first process gas containing a first reactive substance; a reservoir tank (12; Figure 2; column 3; lines 10-25) connected to said gas supply source (19 or 20; Figure 2; column 3; lines 15-25) for reserving the first process gas; a reactor (15; Figure 2; column 3; lines 10-25) connected to said reservoir tank (12; Figure 2; column 3; lines 10-25) for exposing a substrate (14; Figure 2; column 4; line 37) placed therein to the first process gas; a first circulation pipe (36; Figure 2; column 5; line 2) for introducing the first process gas from said reactor (15; Figure 2; column 3; lines 10-25) to said reservoir tank (12; Figure 2; column 3; lines 10-25); a second circulation pipe (return at 85; Figure 2; column 5; line 2) for introducing at least part of the first process gas from said reservoir tank (12; Figure 2; column 3; lines 10-25) to said reactor (15; Figure 2; column 3; lines 10-25); a flow regulating valve (85; Figure 2; column 3; line 20) disposed in said second circulation pipe (return at 85; Figure 2; column 5; line 2), said pressure pump (23; Figure 2; column 3; line 25) being a single unit operative to generate a pressure difference between said reactor (15; Figure 2; column 3; lines 10-25) and said reservoir tank (12; Figure 2; column 3; lines 10-25) to cause the first process gas to flow from said reactor (15; Figure 2; column 3; lines 10-25) to said reservoir tank (12; Figure 2; column 3; lines 10-25) without an intervening pump,

Art Unit: 1792

- a pressure pump upstream valve (27; Figure 2; column 3; line 25) disposed (along 35, 27, 12...) between said reactor (15; Figure 2; column 3; lines 10-25) and said pressure pump (23; Figure 2; column 3; line 25); - claim 10
- iv. a second gas supply source (19 or 20; Figure 2; column 3; lines 15-25) for supplying a second process gas containing a second reactive substance, which is different from the first reactive substance, to said reactor (15; Figure 2; column 3; lines 10-25) - claim 10. Applicant's claim requirement of "which is different from the first reactive substance" is a claim requirement of intended use in the pending apparatus claims.
- v. said pressure pump (23; Figure 2; column 3; line 25) is fluidly connected between said reactor (15; Figure 2; column 3; lines 10-25) and said first circulation pipe (36; Figure 2; column 5; line 2) such that the pressure difference causes the first process gas to flow from said reactor (15; Figure 2; column 3; lines 10-25) to said reservoir tank (12; Figure 2; column 3; lines 10-25) through said first circulation pipe (36; Figure 2; column 5; line 2) while causing the first process gas to flow from said reservoir tank (12; Figure 2; column 3; lines 10-25) to said reactor (15; Figure 2; column 3; lines 10-25) through said second circulation pipe (return at 85; Figure 2; column 5; line 2) – claim 11.

Patel does not teach:

- i. a pressure pump (23; Figure 2; column 3; line 25) fluidly connected *between* said reactor (15; Figure 2; column 3; lines 10-25) and said reservoir tank (12; Figure 2; column 3; lines 10-25) – claim 1
- ii. a turbo-molecular pump connected to said reactor (15; Figure 2; column 3; lines 10-25); a turbo-molecular pump upstream valve disposed between said reactor (15; Figure 2;

column 3; lines 10-25), and said turbo-molecular pump; a dry pump disposed downstream of said turbo-molecular pump; a second gas supply source for supplying a second process gas containing a second reactive substance, which is different from the first reactive substance, to said reactor (15; Figure 2; column 3; lines 10-25); and a bypass pipe connecting said second gas supply source (19 or 20; Figure 2; column 3; lines 15-25) to said reactor (15; Figure 2; column 3; lines 10-25) such that the second process gas can be supplied to said reactor (15; Figure 2; column 3; lines 10-25) without passing through said reservoir tank (12; Figure 2; column 3; lines 10-25) - claim 1

- iii. a pressure pump (23; Figure 2; column 3; line 25) *disposed in said first circulation pipe* (36; Figure 2; column 5; line 2) and fluidly connected between said reactor (15; Figure 2; column 3; lines 10-25) and said reservoir tank (12; Figure 2; column 3; lines 10-25) - claim 10
- iv. a pressure pump (23; Figure 2; column 3; line 25) downstream valve (35; Figure 2) disposed in said first circulation pipe (36; Figure 2; column 5; line 2) and between said pressure pump (23; Figure 2; column 3; line 25) and said reservoir tank (12; Figure 2; column 3; lines 10-25) such that said pressure pump (23; Figure 2; column 3; line 25) downstream valve (35; Figure 2) is downstream of said pressure pump (23; Figure 2; column 3; line 25) – claim 10
- v. a turbo-molecular pump connected to said reactor (15; Figure 2; column 3; lines 10-25); a turbo-molecular pump upstream valve disposed between said reactor (15; Figure 2; column 3; lines 10-25) and said turbo-molecular pump - claim 10
- vi. a dry pump disposed downstream of said turbo-molecular pump – claim 10

Art Unit: 1792

- vii. a bypass pipe connecting said second gas supply source (19 or 20; Figure 2; column 3; lines 15-25) to said reactor (15; Figure 2; column 3; lines 10-25) such that the second process gas can be supplied to said reactor (15; Figure 2; column 3; lines 10-25) without passing through said reservoir tank (12; Figure 2; column 3; lines 10-25) – claim 10
- viii. The substrate (14; Figure 2; column 4; line 37) processing system of claim 10, wherein said pressure pump (23; Figure 2; column 3; line 25) is disposed in said first circulation pipe (36; Figure 2; column 5; line 2) - claim 11

Ohmi teaches a similar wafer processing system (Figure 1) including a turbo-molecular pump (11a), a dry pump (11b), and associated valves (column 5; lines 41-48) including:

- i. a pressure pump (36; Figure 1) fluidly connected *between* said reactor (1; Figure 1) and said reservoir tank (10; Figure 1) – claim 1
- ii. a turbo-molecular pump (11a; Figure 1) connected to said reactor (1; Figure 1); a turbo-molecular pump (11a; Figure 1) upstream valve (18; Figure 1) disposed between said reactor (1; Figure 1), and said turbo-molecular pump (11a; Figure 1); a dry pump (11b; Figure 1) disposed downstream of said turbo-molecular pump (11a; Figure 1); a second gas supply source (16; Figure 1) for supplying a second process gas containing a second reactive substance, which is different from the first reactive substance, to said reactor (1; Figure 1); and a bypass pipe (32,45,33,10a; Figure 1) connecting said second gas supply source (16; Figure 1) to said reactor (1; Figure 1) - claim 1
- iii. a pressure pump (36; Figure 1) *disposed in said first circulation pipe (piping circuit from 1 to 36 and back to 1; Figure 1)* and fluidly connected between said reactor (1; Figure 1) and said reservoir tank (10; Figure 1) - claim 10

Art Unit: 1792

- iv. a pressure pump (36; Figure 1) downstream valve (38a; Figure 1) disposed in said first circulation pipe (piping circuit from 1 to 36 and back to 1; Figure 1) and between said pressure pump (36; Figure 1) and said reservoir tank (10; Figure 1) such that said pressure pump (36; Figure 1) downstream valve (38a; Figure 1) is downstream of said pressure pump (36; Figure 1) – claim 10
- v. a turbo-molecular pump (11a; Figure 1) connected to said reactor (1; Figure 1); a turbo-molecular pump (11a; Figure 1) upstream valve (34a; Figure 1) disposed between said reactor (1; Figure 1) and said turbo-molecular pump (11a; Figure 1) - claim 10
- vi. a dry pump (11b; Figure 1) disposed downstream of said turbo-molecular pump (11a; Figure 1) - claim 10
- vii. wherein said pressure pump (36; Figure 1) is disposed in said first circulation pipe (piping circuit from 1 to 36 and back to 1; Figure 1) - claim 11

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Ohmi's piping elements to the apparatus of Patel.

Motivation to add Ohmi's piping elements to the apparatus of Patel is for enabling sufficient "suction force" as taught by Ohmi (column 7; lines 1-12)

Response to Arguments

6. Applicant's arguments filed May 5, 2009 have been fully considered and they are persuasive.

7. Applicant states:

Art Unit: 1792

“

Claim 1 is patentable over Patel et al. and Ohmi et al., whether taken alone or in combination, for the following reasons. Claim 1 requires a substrate processing system comprising, in part, a second gas supply source for supplying a second process gas containing a second reactive substance, which is different from the first reactive substance, to said reactor; and a bypass pipe connecting said second gas supply source to said reactor such that the second process gas can be supplied to said reactor without passing through said reservoir tank

“

In response, the Examiner agrees that Patel does not teach such a piping arrangement. However, the Examiner believes that the large collection of piping scenarios between the teachings of the cited prior art, and the level of ordinary skill in the art, would necessarily suggest that the addition of a bypass pipe to the apparatus of Patel would be obvious for the reasons given above.

Applicant further states:

“

However, the Office Action asserts, in lines 6-10 of page 5, that Ohmi et al. discloses a second gas supply source and a bypass pipe. Importantly, the Office Action is silent as to the limitation "such that the second process gas can be supplied to said reactor without passing through said reservoir tank" required by claim 1.

“

In response, Applicant is mistaken. The Examiner, in this and the prior action, precisely states that Patel does not teach “such that the second process gas can be supplied to said reactor (15; Figure 2; column 3; lines 10-25) without passing through said reservoir tank (12; Figure 2;

column 3; lines 10-25)". No further correspondence is provided in Ohmi because the Examiner's application of Ohmi is intended to demonstrate not only the specifically cited claim elements not taught by Patel, but also the wide variety of piping arrangements possible in wafer processing systems.

Applicant's remaining arguments at pages 8-9 are with respect to the newly added claims 10 and 11 which are likewise newly addressed in the Examiner's above claim analysis.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272-1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1792 art unit is (571) 273-8300. Any Inquiry

Art Unit: 1792

of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.

/Rudy Zervigon/

Primary Examiner, Art Unit 1792